

pursued emphasises the role of the prudent gatekeeper. The costs of specialist care may be reduced by better management of chronic diseases and through primary and secondary prevention in general practice, but we cannot be sure of that. A mechanism that encourages fewer referrals or less prescribing on the assumption that other forms of treatment will be developed to make this reduction possible is running far ahead of the evidence.

How can fundholders escape from their current dilemma? A moratorium on recruitment to fundholding is needed so that the cost effectiveness of the project can be evaluated. The lack of evaluation<sup>11</sup> reflects badly on the Department of Health, which ostensibly seeks policies based on evidence and care based on knowledge, but evaluation is still possible. A realistic time scale for such evaluation is needed, probably of about three to five years.<sup>12</sup> Pilot projects in advanced fundholding practices will show whether purchasing all services, including social care, can make a difference to public health and the quality of specialist services. Complex questions need to be asked about outcomes for patients rather than just about cash flows, and fundholding needs to be measured against its alternatives to gauge its real value.<sup>13</sup>

This is a test for the government, which can either adopt a more scientific attitude or press on with an unplanned and unevaluated experiment with possible damaging effects on the health service and on public health.<sup>11</sup> If fundholding can

be shown to provide better medical care than its extension to include general practitioners who are not natural innovators can be planned rationally. If fundholding fails to deliver the goods its pioneers can bring their experience back into alternative purchasing mechanisms, hopefully to everyone's benefit.

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## Conflict of interest and the *BMJ*

### *Time to take it more seriously*

Last year we had to reject a review article submitted to us because of conflict of interest. What seemed to us an ad hoc group reviewed the treatments of a particular condition. The referee was initially impressed by the clarity of the review but was perplexed that one particular treatment was given much greater prominence than it deserved. Eventually he realised—from his own knowledge rather than anything stated in the paper—that the group had been brought together and funded by a particular drug company. The company manufactured the treatment that was given extra attention.

Years ago, when our editorials were unsigned, we came to learn that one researcher who regularly wrote for us had substantial financial interests in pharmaceutical companies which might have benefited or otherwise from what was written in the editorials. Conflict of interest may also arise with letters, and many letters that seem to come from individuals who simply have an interest in the subject are in fact prompted by organisations with an interest, financial or otherwise, in the outcome of the correspondence. This is particularly true with tobacco companies. Or conflict of interest may arise with referees. John Maddox, the editor of *Nature*, has described several examples from his personal experience.<sup>1</sup> In one case, a referee sent back his opinion that a paper be rejected together with a paper of his own that he thought *Nature* might prefer to publish.

These are anecdotes, but they give readers some idea of why editors need to think about conflict of interest. Recognising the growing concern, the International Committee of Medical Journal Editors (the Vancouver group) last year produced a statement on conflict of interest.<sup>2</sup> Dennis Thompson from Harvard recently defined just what is meant by conflict of interest—"a set of conditions in which professional judgment

concerning a primary interest (such as patients' welfare or the validity of research) tends to be unduly influenced by a secondary interest (such as financial gain)."<sup>3</sup> He emphasises that conflict of interest is a condition not a behaviour. We should pay attention to conflict of interest not only when it is clear that a judgment has been influenced by conflict of interest but simply when it might have been. Bias works subtly—which is why the double blind randomised controlled trial is such a crucial development—and most of us have limited insight into our own motives, let alone the motives of others. Suggesting that somebody has a conflict of interest is thus far removed from accusing them of dishonest behaviour. But conflict can have important effects: several studies have shown that doctors are more likely to refer patients for tests, operations, or hospital admission when they will benefit financially than when they will not.<sup>4-6</sup>

It is financial conflicts of interest that cause the most concern. The *New England Journal of Medicine*, which has led the way with its policies on conflict of interest,<sup>7</sup> concentrates on financial conflicts of interest on the grounds that they are widespread, optional, and seductive.<sup>8</sup> Thompson says that policies concentrate on financial gain because it is more objective and easier to regulate by impartial rules.<sup>3</sup> These arguments have much to recommend them, but we want to try to have a policy that covers all conflicts of interest. Other sources of conflict are personal, political, academic, and religious, and we believe that these may be just as potent as financial conflicts.

Editors need to deal with conflict of interest in order to make sure that the quality of research, judgments, and information in their journals is not reduced by secondary interests. They must also pay attention to the issue in order to

play their part in maintaining public confidence in the judgments of professionals. In the United States, where relationships between doctors and the medical industrial complex are much closer than in most other countries,<sup>9,10</sup> the public already has severe doubts about how much doctors' judgments are influenced by financial gain. Other countries have a chance to prevent the proliferation of such public doubts.

To attempt to abolish conflict of interest is impossible, and I have heard it argued that the only person who does not have some sort of vested interest in a subject is somebody who knows nothing about it at all. Some conflicts of interest can, however, be avoided: none of our editorial staff have shares in any company whose share price might be affected by information we might publish; if we go to a meeting or on a trip to produce a report then we go at our own expense; and we avoid asking anybody who has a strong conflict of interest to write us an editorial or referee a paper for us.

The commoner remedy for conflict of interest is disclosure. We plan as soon as possible to include the source of funding for a research study in all scientific papers, and we want authors and referees to let us know of any conflicts of interest they may have. We will send them a document explaining what we mean by conflict of interest and ask them to sign saying they have no conflict of interest, or to explain the nature of any conflict. Sometimes we may decide that our readers should know about a conflict of interest and we will then publish a note on the conflict—after consultation with the authors or reviewers. To disclose a conflict of interest

about a piece of work does not mean that the work is worthless (otherwise there would be no point in publishing it); but readers will want to consider that information along with many other factors in making their own judgment on the work.

The *BMJ* has for several years subscribed to the uniform requirements of the Vancouver group that ask authors to let us know about conflicts of interest, but people rarely do so. Now we are moving the policy along by always recording the source of funding for research, asking people to sign a document, and sometimes disclosing conflicts. Perhaps we will eventually have to do more. The editors of the *New England Journal of Medicine* have said that "most academic institutions and journals have not gone far enough in dealing with this problem"<sup>8</sup>—and that is still truer on this side of the Atlantic.

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## Assessing the human condition: capture-recapture techniques

*Allows accurate counts of those difficult to reach populations*

Evaluating the human condition occurs in many disciplines—for example, epidemiology, sociology, political sciences, criminology, and market research. Despite advances in these fields progress has been sluggish compared with that in the "hard" sciences. A primary force for rapid developments in these sciences has been the discovery and use of new technologies (for example, the polymerase chain reaction, electron microscopy, carbon-14 dating), which increase the precision of measurement and reduce costs, resulting in a rapid accumulation of knowledge.<sup>1,2</sup> Human population science has society as its laboratory and "counting humans" as its basis. Counting techniques, however, have changed little this century. The use of capture-recapture techniques could bring about a paradigm shift in how counting is done in all the disciplines that assess human populations.

Historically, the main approach to evaluating human populations has been to find the members of a community with a characteristic of interest and count them—for example, researchers have counted people with a particular disease (epidemiology), income level (economics), and party affiliation (political science). This approach is rooted in the belief that one needs to count and classify everyone to know about them. Complete enumeration, though, is costly and inefficient. Alternatives such as sampling a small group and extrapolating the results to a region or nation have been developed. These techniques may, however, be slow, costly, limited, and "foreign" to the people who need the data for policy—for example, governments.

Governments typically cannot wait for population scientists

to come up with answers to their urgent questions. Instead they extract data from vast repositories of routinely collected lists of people categorised according to social, medical, or demographic factors. But because these lists may be incomplete, the conclusions may be flawed. Could the technique of capture-recapture provide an answer to this impasse of accurate but limited data versus inaccurate but broad based data?

Counting is not limited to humans. Animal population scientists share many goals with human population scientists, but in terms of the data they have collected the animal scientists are way ahead. This is because animal ecologists recognised that a complete count of wildlife was impossible and quickly scrapped human demography's goal of complete enumeration. Instead, they developed intuitive estimators of the population based on incomplete sampling; that of capture-recapture.<sup>3</sup>

It works like this. If you wanted to ascertain the number of fish in the Sea of Galilee you would go out and catch fish, tag them, and then release them. On subsequent days you would net fish again and note the number of tagged fish in the catch. By using a simple formula one can estimate the total number of fish, with confidence intervals surrounding the estimate. This approach collects samples (lists) and looks for tags (duplicates) and from this determines the degree of undercounting. The sample is then adjusted for the degree of ascertainment. Further advances include log linear modelling (to evaluate and control for the degrees of dependency among samples) and "open" system models (which permit migration in and out).<sup>3-5</sup>